U.S. Army Corps of Engineers - Omaha District

Tiered Environmental Assessment
&
Finding of No Significant Impact

PUBLIC LAW 84-99 EMERGENCY LEVEE REHABILITATION PROGRAM
&
ADVANCED MEASURES CIVIL EMERGENCY MANAGEMENT PROGRAM

Missouri River Levee Unit L550; Atchison County, MO.

PROJECT **DATE**

Tiered Environmental Assessment

Public Law 84-99 Emergency Levee Rehabilitation Program
&
Advanced Measures Civil Emergency Management Program

Introduction: In accordance with the National Environmental Policy Act and implementing regulations, a Programmatic Environmental Assessment for PL 84-99 Levee Rehabilitation Projects and Advanced Measure Responses in the U.S. Army Corps of Engineers Omaha District was prepared in November 2011, and is incorporated by reference herein. This project-specific NEPA Review is tiered off of the programmatic document to determine if the proposed levee rehabilitation project meets the description and criteria of the Recommended Plan in the Programmatic Environmental Assessment. Where impacts of the site specific activity are sufficiently covered in the programmatic EA, this Tiered EA will incorporate that information by reference. If the proposed levee rehabilitation project falls outside of the scope of the Programmatic EA, additional analysis will be included in this Tiered EA to determine if site-specific activities could result in adverse impacts not previously evaluated or anticipated, or not consistent with the original programmatic EA. Subsequent documentation contained herein will define the potential degree of impact to the resources of concern and the measures to be taken to reduce impacts to less than a significant level. Coordination with the appropriate Federal and/or state agencies will occur where additional alternatives or measures are needed to avoid, minimize and/or mitigate for adverse impacts to a specific resource.

This assessment meets the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code [USC] 4321 et seq.); the President's Council of Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] 1500 – 1508) and the U.S. Army Corps of Engineers ER 200-2-2 (33 CFR 230) . If it is determined that impacts are less than significant, a Finding of No Significant Impact will be signed by the District Commander. If it is found that significant impacts will result from the implementation of the proposed alternative, then an environmental impact statement (EIS) will be prepared.

Project Location and Timing: Missouri River Levee Unit L550; Atchison County, MO. The project will begin in November. Due to the emergency nature of this activity; work will begin as soon as the contractor is able to mobilize in order to ensure completion of work by spring.

Description of Recommended Repair: Eighteen individual areas have been identified for repair. The project would restore levee areas (landward seepage berms and riverside slopes) to design profile using compacted cohesive fill; adding 6-inches of crushed rock to levee crest; installing new 8-inch diameter relief wells (with gravel packs, protective bollards, and access sumps) where needed; rehabilitating damaged relief wells by sounding and purging; replacing damaged headwalls; reconstructing spur dikes; repairing riverside scours; placing riprap; constructing temporary haul roads; setting back levees at Areas 7and areas 14/15 (approximately 31.4 acres reclaimed to the floodplain); and placing top-soil and reseeding all disturbed areas not otherwise rocked.

Borrow Source Description: Five sources of borrow have been identified for use in levee setbacks. The five sources are listed here in order of use. First, construction equipment (bulldozers, scrapers, etc.) would simply push sand and riverwash materials deposited as a result of flooding off of the agricultural land and pile it up along specified setback locations. Second, portions of the damaged levee riverward of the setback line would be demolished and that material reused. Because it is likely that the sand and riverwash, along with the demolished levee material would not provide adequate repair quantities, a third method, borrow from agricultural areas would be used. In certain circumstances, such as at Area 7, ground conditions may be too wet to allow access of construction equipment to the area, although this determination will not be made until the actual time of construction. If conditions are too wet at time of construction, a fourth method, obtaining borrow from the floodplain with a hydraulic dredge, would be used. The dredges would access the floodplain from the Missouri River, moving landward from the main Missouri River channel dredging their way toward established floodplain borrow sites. Upon completion, the dredges would make their way back out through the newly dredged channel, leaving behind a new open water area that is connected to the river. In the event that the floodplain is unable to provide needed quantities, a fifth method, dredging from the main Missouri River channel would be conducted. Missouri River channel dredging would be used only as a last resort. It is currently believed that channel dredging will not be needed for this project but that determination will be made as construction progresses.

Threatened and Endangered Species: Please refer to the attached entitled: *Biological Assessment, Public Law 84-99 Emergency Levee Rehabilitation Program & Advanced Measures Civil Emergency Management Program, Missouri River Levee Units L-550 and L-575, Atchison County, Missouri and Fremont County, Iowa* for a description of potential effects to listed species from the proposed project.

Indiana Bat – No Effect
The proposed project is scheduled to start in November and be completed before the rains and snowmelt in spring 2012. The bat initiates hibernation in early to mid-October. Because the bats would be hibernating during construction, the proposed project would not affect this species. In addition, because any borrow material obtained for repairs would come from non-forested areas; the proposed project would not impact the bat's habitat.

Pallid Sturgeon – May Affect, Not Likely to Adversely Affect
Dredging Affects - DeLonay 2011, while studying pallid sturgeon behavior around dredging operations, found that the species may not be particularly sensitive to dredging noise. Thus, it is believed that noise produced by dredging would not interfere with pallid sturgeons' normal feeding and sheltering, and would not result in significant impacts. Dredging for this project would deposit materials in terrestrial locations along new levee alignments, and would not side cast it into the river. However, it is still anticipated that the dredging operation would result in some temporary, localized elevation of suspended sediments within the river. The changes in suspended sediments from dredging are not anticipated to differ substantially from naturally

occurring levels. Studies conducted by the USACE found that organisms that evolved and are naturally associated with turbid environments were relatively insensitive to the effects of sediment suspensions in the water and that, in general, dredging-induced turbidity is likely not of major environmental concern in most cases (USACE 1978). Since pallid sturgeon adapted to naturally variable habitats that included unstable sediment conditions, they would likely be able to withstand and recover from any stresses imposed by dredging (USACE 1978). Turbidity plumes, in some cases, are used by pallid sturgeon as cover habitat from sight-feeding piscivorous fishes (DeLonay et. al. 2009). Thus, any short term incremental increases in turbidity resulting from the proposed dredging operations would not significantly impact the species and may even provide some short term benefits.

Main channel dredging - Based on the time of work, autumn/winter months, no impacts to sturgeon eggs or larvae would occur. However, adults and juvenile sturgeon could be affected by dredging entrainment and by encounters with boat propellers. Ecological Specialists, Inc. (ESI, 2010) conducted monitoring at Chain of Rocks in St. Louis, Missouri to determine fish entrainment from dredging operations. ESI captured numerous fish, but found that no pallid sturgeon were entrained during their study. ESI believed that due to the time of year that dredging was occurring, during the winter months, sturgeon were using deeper channel areas and were out of range of where dredging was occurring. The dredge location (main channel), dredging methods and the timing of dredging are similar for this project to that of St. Louis. The amount of material needed from the main river channel for the proposed project is far less than what was obtained at the Chain of Rocks project (180,000 cubic yards for all PL 84-99 projects vs. 456,603 cubic yards for the Chain of Rocks project). Based on the similar dredging methods and reduced quantities needed, it is anticipated that the risk for take of pallid sturgeon via entrainment is very low, and not significant.

Side Channel Dredging - In the 2003 amendment to the U.S. Fish and Wildlife Service's Biological Opinion for operations on the Missouri River, the Service determined that side channel and backwater dredging disturbance for purposes of establishing SWH is not likely to result in jeopardy to the species and the effect would largely be offset by the resulting SWH creation. This project, while not specifically associated with the Missouri River Recovery Program, would reestablish SWH at the MRRP Hamburg Bend site, and also create additional off channel habitats via dredging new channels within the floodplain. It is believed that reestablishing SWH and creating new off channel habitat in the floodplain would have long term beneficial effects to pallid sturgeon and the ecology of the Missouri River.

Bed Degradation - USACE, Omaha District (2011) analyzed the possibility of dredging the Missouri River as a potential source of fill material for use in repairing the levee breaches at L-500 and L-575. The Corps concluded that up to 180,000 cubic yards of material is likely tolerable without severe consequences to bed degradation. To minimize any potential impacts to the river bed, and associated indirect effects to pallid sturgeon habitat, the Corps established a set of Dredging Operation Guidelines (attached) that would be adhered to during all PL 84-99 dredge operations. As a result, the proposed project would have no significant impacts to the Missouri River bed or pallid sturgeon habitat.

Western Prairie Fringed Orchid - The proposed project area is adjacent to agricultural fields that are regularly farmed so it is likely no orchids occur in the proposed project area. Additionally, water has remained on site for approximately four months due to the

levee breaches. Thus, if orchids had occurred on site, it is likely that those species would have been inundated and killed. As a result, no impacts to the orchid are anticipated.

Wetland Impacts: The U.S. Fish and Wildlife Service's National Wetlands Inventory Database was consulted to determine if wetlands occurred within the proposed project area. Results showed a 5.15 acre freshwater emergent wetland near Area 11 and a 1.27 acre freshwater forested/shrub wetland near Area 13.

During the 2011 high flow event, levee breaches occurred at Areas 7, 14 and 15 causing sediment-ladened Missouri River water to flood a majority of the interior area normally protected by Levee L-550. Review of post-flood photographs showed that the emergent wetland at Area 11 was inundated and likely silted in, while the forested wetlands merely became inundated. Impacts to the forested wetlands would be determined once the area has drained and dried.

There is potential that minor impacts (incidental fill and/or entry by construction equipment) could occur at the forested wetlands site. Explicit instructions would be provided to construction crews to avoid entry into this area and to use silt-trapping devices to prevent construction-related fill impacts. In the event that minor fills are unavoidable, General Permit 41, issued by the Regulatory Office in Kansas City, Missouri would be used for this project. This permit authorizes excavation or placement of fill material for protection and/or repair of existing flood damaged structures including, but not limited to, repair of levees to existing elevations and cross-sections, breach closures and borrow operations. The General and Special Conditions attached as part of that permit 41 also would be implemented.

Cultural Resources in Project Area: A cultural resources file search on November 1, 2011, revealed no recorded historic properties at L-550. No recorded steamboat wrecks are located within the one-mail radius of the proposed project area. The nearest steamboat wreck to L-550, the Kansas, is located approximately 4 miles away. A majority of the potential borrow sites consist of redeposited sediments and/or soils that have been under cultivation. There is a low potential for unanticipated discovery of cultural resources in the project area.

In the event that historic resources are uncovered, work will be halted immediately and a district archeologist will be notified. The work will not be continued until the area is inspected by a staff archeologist. If he or she determines that the discovery requires further consultation, the appropriate State Historic Preservation Office will be notified.

Literature Cited

Ecological Specialists, Inc. 2010. Final Report: Monitoring of Dredged Material for Fish Entrainment with Special Emphasis on the Pallid Sturgeon, Phase III North Berms Dredging Chain of Rocks Canal, Mississippi River, Madison County, IL.

DeLonay, A.J., R. B. Jacobson, D. M. Papoulias, D. G. Simpkins, M. L. Wildhaber, J. M.

Reuter, T. W. Bonnot, K. A. Chojnacki, C. E. Korschgen, G. E. Mestl, and M. J. Mac. 2009. Ecological Requirements for Pallid Sturgeon Reproduction and Recruitment in the Lower Missouri River: A Research Synthesis 2005-08. (U.S. Geological Survey Scientific Investigations Report 2009-5201). 59pp.

DeLonay, Aaron. Research Ecologist, U.S. Geological Survey, Columbia Research Station. Telephone conversation with Larry Dominguez (ENTRIX, Inc.) regarding behavior of adult sturgeon, April 4, 2010, as sited in USACE 2011.

USACE (U.S. Army Corps of Engineers). 1978. Effects of Dredging and Disposal on Aquatic Organisms. (Technical Report DS-78-5.) Website (http://el.erdc.usace.army.mil/dots/pdfs/ds78-5.pdf) accessed on June 29, 2010.

USACE, 2011. Missouri River Bedload Estimation for Dredging Recharge. 9 pp.

Area 11: Inundated 30 August 2011

Area 13: Inundated 30 August 2011

Compliance with Programmatic EA and Applicable Environmental Laws

(To be completed by Environmental Resources Specialist)

NWO Programmatic EA	**Yes**	**No**
SOP for Selection of Borrow Sites	_X___	____
Regulatory Authorization Obtained	__X__	____
Section 401 State Water Quality Certification	_X___	____
Section 402 Stormwater NPDES Permit	__X__	____
Federal Laws and Polices		
Clean Air Act, as amended, 42 U.S. C. 7401-7671g, et seq.	__X__	____
Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq.	_X___	____
Endangered Species Act, 16 U.S.C. 1531, et seq.	__X__	____
Federal Water Project Recreation Act, 16 U.S.C. 4601-12, et seq.	__X__	____
Fish and Wildlife Coordination Act, 16 U.S.C. 661, et seq.	__X__	____
National Environmental Policy Act, 42 U.S.C. 4321, et seq.	__X__	____
National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470a, et seq.	__X__	____
Rivers and Harbors Act, 33 U.S.C. 403, et seq.	_X___	____
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	__X__	____
Farmland Protection Policy Act, 7 U.S.C. 4201, et. seq.	_X___	____
Protection & Enhancement of the Cultural Environment (Executive Order 11593)	_X__	____
Floodplain Management (Executive Order 11988)	__X__	____
Protection of Wetlands (Executive Order 11990)	_X___	____
Environmental Justice (Executive Order 12898)	__X__	____
Invasive Species (Executive Order 13122)	__X__	____

The proposed project has been evaluated and determined to be in compliance with the Programmatic Environmental Assessment for Public Law 84-99 Emergency Levee Rehabilitation Program and Advanced Measures Civil Emergency Management Program dated October 2011.

_____ _____

Signature **Date**

Environmental Resources Specialist

_____ _____

Signature **Date**

Chief, Environmental Resources Section

Biological Assessment
Public Law 84-99 Emergency Levee Rehabilitation Program
&
Advanced Measures Civil Emergency Management Program
Missouri River Levee Units L-550 & L-575
Atchison County, Missouri & Fremont County, Iowa

Introduction: The PL 84-99 Emergency Levee Rehabilitation Program and Advance Measures Civil Emergency Management Program was established to provide emergency assistance to levee districts and communities (project Sponsors) in the form of levee repair and/or flood damage reduction. The high flow event of 2011 caused damages to numerous components of Missouri River Levees L-550 and L-575. The U.S. Army Corps of Engineers, Omaha District (Corps), in cooperation with the project sponsors, the Atchison Levee District (L-550) and the Fremont County Supervisors (L-575), propose to repair the levee units back to their original design profile. The proposed work is scheduled to take place immediately to ensure a level of flood risk management is provided in preparation of rain and snow melt in the coming spring of 2012.

Authority: These projects are authorized under 33 U.S.C. 701n (commonly referred to as Public Law 84-99 or PL 84-99); the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 *et seq*); and are being completed according to Army Regulation 500-60, Disaster Relief; and Engineer Regulation 1130-2-530, Flood Control Operations and Maintenance Policies. These laws and authorities allow the U.S. Army Corps of Engineers (USACE) to provide a levee rehabilitation program for repairing levees after flood events and to perform Advanced Measures prior to flooding or flood fighting to protect against loss of life and significant damages to urban and/or public facilities.

Project Location: L-550: The proposed project is located along the left descending bank of the Missouri River at Levee Unit L-550. The upstream tieback follows the left banks of the Nishnabotna River and High Creek; the downstream tieback follows the right bank of Rock Creek. The levee is situated across the Missouri River from Brownsville, Nebraska (Figure 1a).

L-575: The proposed project is located along the left descending bank of the Missouri River at Levee Unit L-575. The upstream tieback follows the left bank of Plum Creek; the downstream tieback follows the right bank of the Nishnabotna River. The levee is situated near the town of Hamburg, Iowa (Figure 1b).

Project Description: L-550: Eighteen individual areas have been identified for emergency repair. The project would restore levee areas (landward seepage berms and riverside slopes) to design profile using compacted cohesive fill; adding 6-inches of crushed rock to levee crest; installing new 8-inch diameter relief wells (with gravel packs, protective bollards, and access sumps) where needed; rehabilitating damaged relief wells by sounding and purging; replacing damaged headwalls; reconstructing spur dikes; repairing riverside scours; placing rock riprap; repairing/constructing haul roads; setting back levees at breached Areas 7 (Figure 3) and 14/15 (Figure 4; approximately 31.4 total acres reclaimed to the floodplain); and placing top-soil and reseeding all areas disturbed by construction and not otherwise rocked. Five potential sources of borrow have been identified for use in levee setbacks. The five sources are listed here in order of use. First, construction equipment (bulldozers, scrapers, etc.) would simply push sand and riverwash materials deposited as a result of flooding off of the agricultural land and pile it up along specified setback locations. Second, portions of the damaged levee riverward of the setback line would be demolished and that material reused. Because it is likely that the levee material, sand, and riverwash deposits would not provide adequate repair quantities, a third

method, borrow from agricultural areas would be used. In certain circumstances, such as at Area 7, ground conditions are thought to be too wet to allow access of construction equipment, although this determination will not be made until the actual time of construction. If conditions are too wet at time of construction, a fourth method, obtaining borrow from the floodplain and constructed side channels, would be used. This would include both material found in the floodplain areas riverward of the existing levees, and in the previously constructed Missouri River Recovery Project (MRRP) Shallow Water Habitat (SWH) project at Lower Hamburg Bend that accumulated with sediments during the flood of 2011. To access these areas, the dredges would enter and exit from the main Missouri River channel, dredging their way toward established floodplain borrow sites. Upon completion, dredgers would leave behind either restored chutes and off channel habitats as previously established during Missouri River Recovery efforts, and/or newly established off channel areas in the floodplain that would have ecological benefits to fish and other aquatic species. In the event that the floodplain is unable to provide needed quantities, a fifth method, dredging from the main Missouri River channel would be conducted. Missouri River channel dredging would be used only as a last resort and it is currently believed that channel dredging will not be needed for these projects but that determination will be made as construction progresses. For purposes of these projects, we are assuming that the main channel will be utilized to ensure that emergency operations may proceed as planned prior to the upcoming spring season. As explained later in the document, no more than 180,000 cubic yards of material would be removed from the main Missouri River channel for levee repairs.

L-575: Twenty-one individual areas have been identified for repair. The project would restore levee areas (landward seepage berms and riverside slopes) to design profile using compacted cohesive fill; adding 6-inches of crushed rock to levee crest; repairing boils; installing new 8-inch diameter relief wells (with gravel packs, protective bollards, and access sumps); rehabilitating other relief wells (sounding and purging); replacing damaged headwalls; repairing pump stations; repairing riverside scours; placing riprap; reinforcing embankments with piggy-back berms; repairing/constructing temporary haul roads; setting back levees at breached Areas 3 (Figure 5), 16 (Figure 6), and 18 (Figure 7; approximately 276.5 total acres reclaimed to the floodplain); and placing top-soil and reseeding all disturbed areas not otherwise rocked. To setback the levee at breached locations along L-575, all methods as described above for L-550 would be considered, except for the removal of material from Lower Hamburg Chute.

Project Purpose: The purpose of the PL 84-99 Emergency Levee Rehabilitation Program and Advance Measures Civil Emergency Management Program is to provide emergency assistance to levee districts and communities (project Sponsors) in the form of emergency levee repair and/or flood damage reduction as directed by Congress (33 U.S.C. 701n).

Threatened and Endangered Species: In accordance with Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service's (USFWS) web page (http://www.fws.gov/midwest/endangered/lists/missouri-cty.html) was consulted for listed species occurring in Atchison County, Missouri to determine which federally listed threatened or endangered species could potentially occur in the proposed project areas (L-550 & L-575). The following species were found on the website and listed as occurring in Atchison County, Missouri: Indiana bat (*Myotis sodalist*), pallid sturgeon (*Scaphirhynchus albus*), and western prairie fringed orchid (*Platanthera praeclara*).

Similarly, the U.S. Fish and Wildlife Service's (USFWS) web page (http://www.fws.gov/midwest/endangered/lists/iowa_cty.html) was consulted for listed species occurring in Fremont County, Iowa to determine which federally listed threatened or endangered species could also potentially occur in the proposed project area (L-575). The following species

were found on the website and listed as occurring in Fremont County, Missouri: pallid sturgeon (*Scaphirhynchus albus*), western prairie fringed orchid (*Platanthera praeclara*), and prairie bush clover (*Lespedeza leptostachya*).

Affects Determinations:

Indiana Bat (*Myotis sodalist*)-Endangered
NO EFFECT
Indiana bats hibernate during winter (October to April) in caves or, occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Very few caves within the range of the species have these conditions. After hibernation, Indiana bats migrate to their summer (April to October) habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats forage in or along the edges of forested areas. Loss and fragmentation of forested habitats can affect bat populations. Insect-eating bats may seem to have an unlimited food supply, but in local areas, insects may not be plentiful because of pesticide use. This can also affect the quality of the bats' food supply. Bats may be affected by eating contaminated insects, drinking contaminated water, or absorbing the chemicals while feeding in areas that have been recently treated. Because Indiana bats in northern Missouri have already initiated their winter hibernation (Ledwin, pers. comm.), the proposed project would not affect this species. Floodplain borrow sites are areas without riparian trees, and are not associated with caves or abandoned mines, so no impacts to its habitat are anticipated. The proposed work is scheduled to be completed prior to 2012 spring rains and snowmelt.

Pallid Sturgeon (*Scaphirynchus albus*)-Endangered
MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
Pallid sturgeons evolved and adapted to living close to the bottom of large, turbid rivers with a natural hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars. Within the Missouri River basin, very few wild pallid sturgeons exist, although efforts are being undertaken to increase their habitats and numbers (MRRP 2007). Spawning is thought to be initiated by spring flows and generally occurs between May and June over gravely surfaces. Pallid sturgeon may occur in the project area throughout the year so it is possible that they may be impacted by the proposed dredging operations.

Dredging could directly affect adult and juvenile pallid sturgeon through entrainment in the dredge or through encounters with boat propellers, and cause injury or mortality (USACE 2011a). As dredging is scheduled to occur immediately, within the autumn months, no affects to pallid sturgeon eggs or larvae are anticipated.

From January 19 to February, 2010, Ecological Specialists, Inc. (ESI) conducted a monitoring effort to determine fish entrainment from dredging operations at the Chain of Rocks Canal Project in St. Louis, Missouri. ESI monitored entrainment water associated with the dredging of approximately 456,603 cubic yards of material over a 49.25 hour time frame. During the sampling effort, a total of 4 shovelnose sturgeon, 0 pallid sturgeon, and 28 other species of fish (shad, carp, catfish, sunfish, and bass) were collected. The amount of material potentially needed from the main river channel for this proposed project is far less than what was utilized at the Chain of Rocks project. The dredging methods and the timing of dredging are similar to that of ESI. The amount of material needed from the main river channel for the proposed project is far less than what was obtained at the Chain of Rocks project. Based on similar dredging

methods and reduced quantities needed, it is anticipated that the risk for take of pallid sturgeon via entrainment is very low.

It is thought that pallid sturgeon tend to prefer deeper water in and along main channels of the river during summer, autumn, and winter, as opposed to a broader range of habitats during the spring months when water temperatures are between 10 and 20º C (Hurley *et. al.* 2004). As such, it is believed that the off-channel dredging proposed in this project during the late fall timeframe would have a very low probability to effect pallid sturgeon. In addition, in the 2003 amendment to the U.S. Fish and Wildlife Service's Biological Opinion for operations on the Missouri River, the Service determined that side channel and backwater dredging disturbance for purposes of establishing SWH is not likely to result in jeopardy to the species and the effect would largely be offset by the resulting SWH creation. This project, while not specifically associated with the Missouri River Recovery Program, will reestablish SWH at the MRRP Hamburg Bend site, and also create additional off channel habitats via dredging of backwaters within the floodplain. It is believed that reestablishing SWH and creating new off channel habitat in the floodplain would have long term beneficial effects to pallid sturgeon and the ecology of the Missouri River.

Dredging could also disturb the normal feeding and sheltering habits of pallid sturgeon through dredging noise (USACE 2011). Underwater human-caused noise has been documented to influence fish behavior in general (Nightingale and Simenstad 2001). It is expected that noise from the operation of dredges may result in avoidance of the dredging area by fish species sensitive to noise over the duration of the activity. Adult pallid sturgeon have been observed using radio telemetry near dredge boats (DeLonay pers. comm.) and it was suggested that this species may not be particularly sensitive to dredging noise. Thus, it is believed that noise produced by dredging would not interfere with pallid sturgeons' normal feeding and sheltering, and would not adversely affect the species.

While dredging for this project will deposit materials into the new levee alignment and not side cast it back into the river, it is still anticipated that the dredging operation would result in some temporary, localized elevation of suspended sediments caused by the cutter head of the dredge. The changes in suspended sediments from dredging are not anticipated to differ substantially from naturally occurring levels. Studies conducted by the USACE found that organisms that evolved and are naturally associated with turbid environments were relatively insensitive to the effects of sediment suspensions in the water and that, in general, dredging-induced turbidity is probably not of major environmental concern in most cases (USACE 1978). Pallid sturgeon are adapted to naturally variable areas that include unstable sediment conditions; thus, they would likely be able to withstand and recover from any stresses imposed by dredging (USACE 1978). The short-term increases in turbidity downstream of the dredge therefore, should not result in adverse impacts to pallid sturgeon because the Missouri River carries far less sediment now than it once did. Turbidity plumes are used by pallid sturgeon as cover habitat from sight-feeding piscivorous fishes (DeLonay et. al. 2009). Thus, short term incremental benefits to pallid sturgeon habitat may result from the proposed dredging operations.

The USACE Kansas City District completed an Environmental Impact Statement (EIS) regarding the impact of commercial dredging on observed channel degradation in the Lower Missouri River (USACE 2011b.) The Lower Missouri River generally refers to the portion of the Missouri River from its confluence with the Mississippi River near St. Louis, Missouri, upriver to Gavins Point Dam, which is located near Yankton, South Dakota. The EIS concluded a direct correlation with sand removal and river bed degradation. The Corps (2011a) analyzed the possibility of dredging the Missouri River as a potential source of fill material for use in repairing the levee breaches at L-500 and L-575. The Corps concluded that up to 180,000 cubic

yards of material is likely tolerable without severe consequences to bed degradation. To minimize any potential impacts to the river bed, and associated indirect effects to pallid sturgeon habitat, the Corps established a set of Dredging Operation Guidelines (attached) that would be adhered to during all PL 84-99 dredge operations.

As a result of the analysis conducted, the proposed project may affect, but is not likely adversely affect pallid sturgeon.

Western Prairie Fringed Orchid (*Platanthera praeclara*)–Threatened
NO EFFECT
The western fringed prairie orchid is a perennial distinguished by large, white fringed flowers that give them a feathery appearance. The orchid occurs most often in mesic to wet unplowed tallgrass prairies and meadows but have been found in old fields and roadside ditches. The prairie fringed orchids were added to the U.S. list of Endangered and Threatened Wildlife and Plants on September 28, 1989. The greatest threat to the prairie fringed orchids is habitat loss, mostly through conversion to cropland. Competition with introduced alien plants, filling of wetlands, intensive hay mowing, fire suppression, and overgrazing also threatens this species. Orchids have been collected because of their rarity and beauty, which also contributes to its decline. The prairie fringed orchids depend on hawkmoths for pollination. Any threat to these insects, such as the use of insecticides, is a threat to the prairie fringed orchids. The proposed project area is adjacent to agricultural fields that are regularly farmed so it is likely no orchids occur in the proposed project area. Additionally, water has remained on site for approximately four months due to the levee breaches. Thus, if orchids had occurred on site, it is likely that those species would have been inundated and killed. As a result, no impacts to the orchid are anticipated.

Prairie Bush Clover (*Lespedeza leptostachya*)-Threatened
NO EFFECT
Prairie bush clover is a prairie plant found only in the tall grass prairie region. It is a member of the bean family and a midwestern "endemic" of the upper Mississippi River Valley. Some of the surviving populations are threatened by conversion of pasture to cropland, overgrazing, agricultural expansion, herbicide application, urban expansion, rock quarrying, and transportation right-of-way maintenance and rerouting; hybridization with the more common round-headed bush clover has also been identified as a potential threat in some areas. The proposed project area is adjacent to agricultural fields that are regularly farmed so it is likely no prairie bush clovers occur in the proposed project area. Additionally, water has remained on site for approximately four months due to the levee breaches. Thus, if clovers had occurred on site, it is likely that those species would have been inundated and killed. As a result, no impacts to the orchid are anticipated.

Determination of Effect: The proposed project would have no affect on Indiana bat, western prairie fringed orchid, or prairie bush clover. The proposed project may affect, but is not likely to adversely affect pallid sturgeon.

Prepared by: _____ Date: _____

Matthew D. Vandenberg
Environmental Resources Specialist
U.S. Army Corps of Engineers, Omaha District

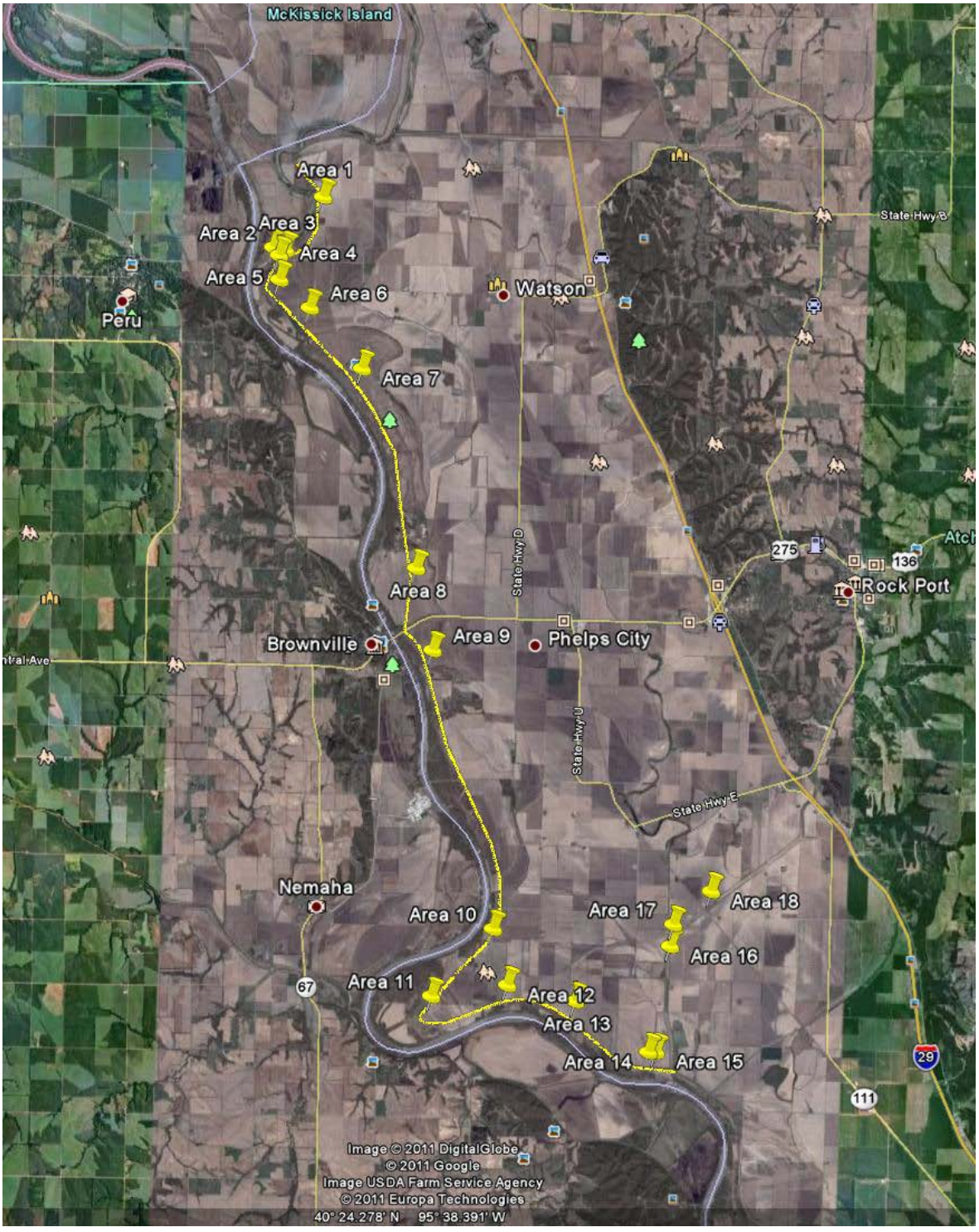

Figure 1a. Aerial Map of Missouri River Levee Unit L-550 showing damage area locations.

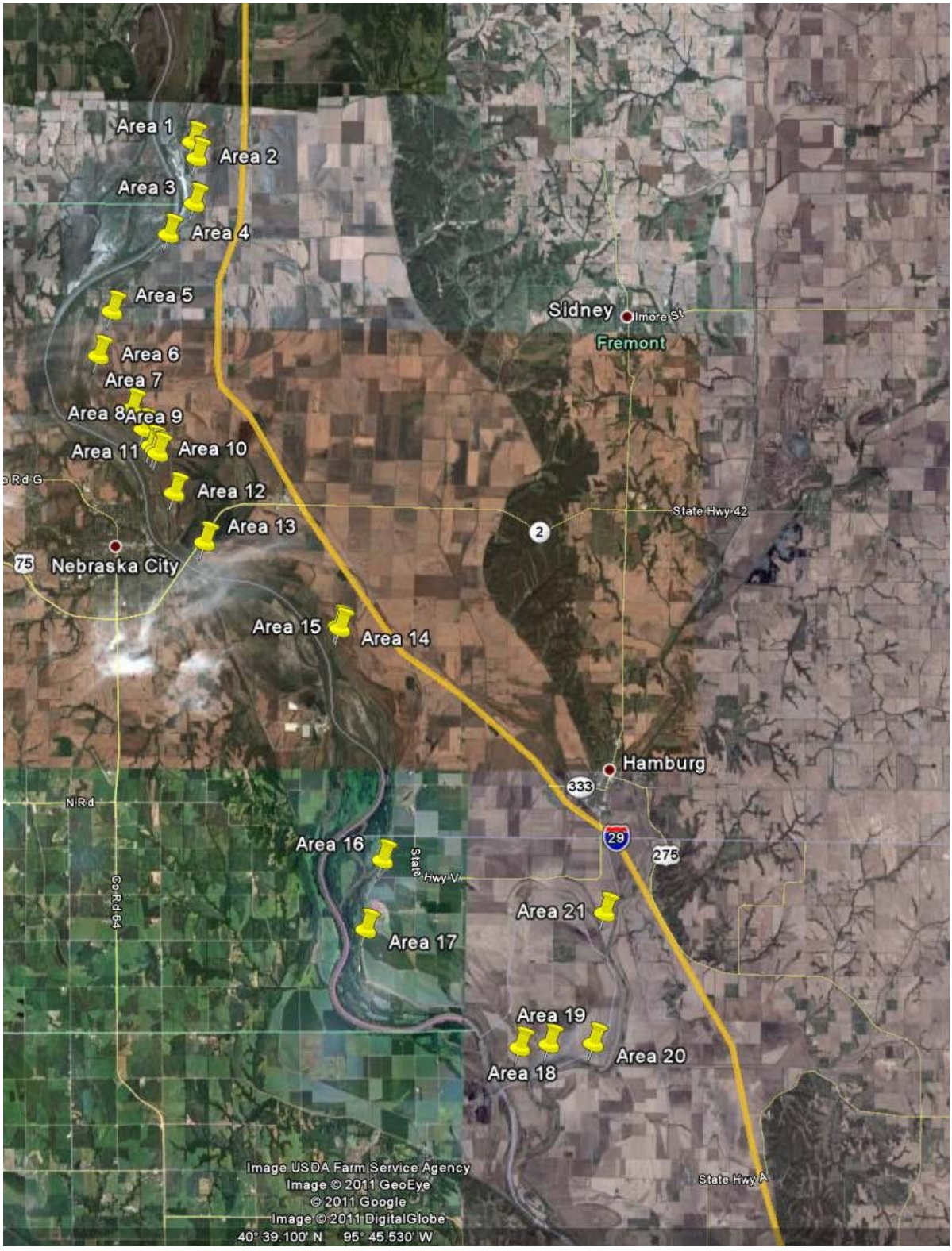

Figure 1b. Aerial Map of Missouri River Levee Unit L-575 showing damage area locations.

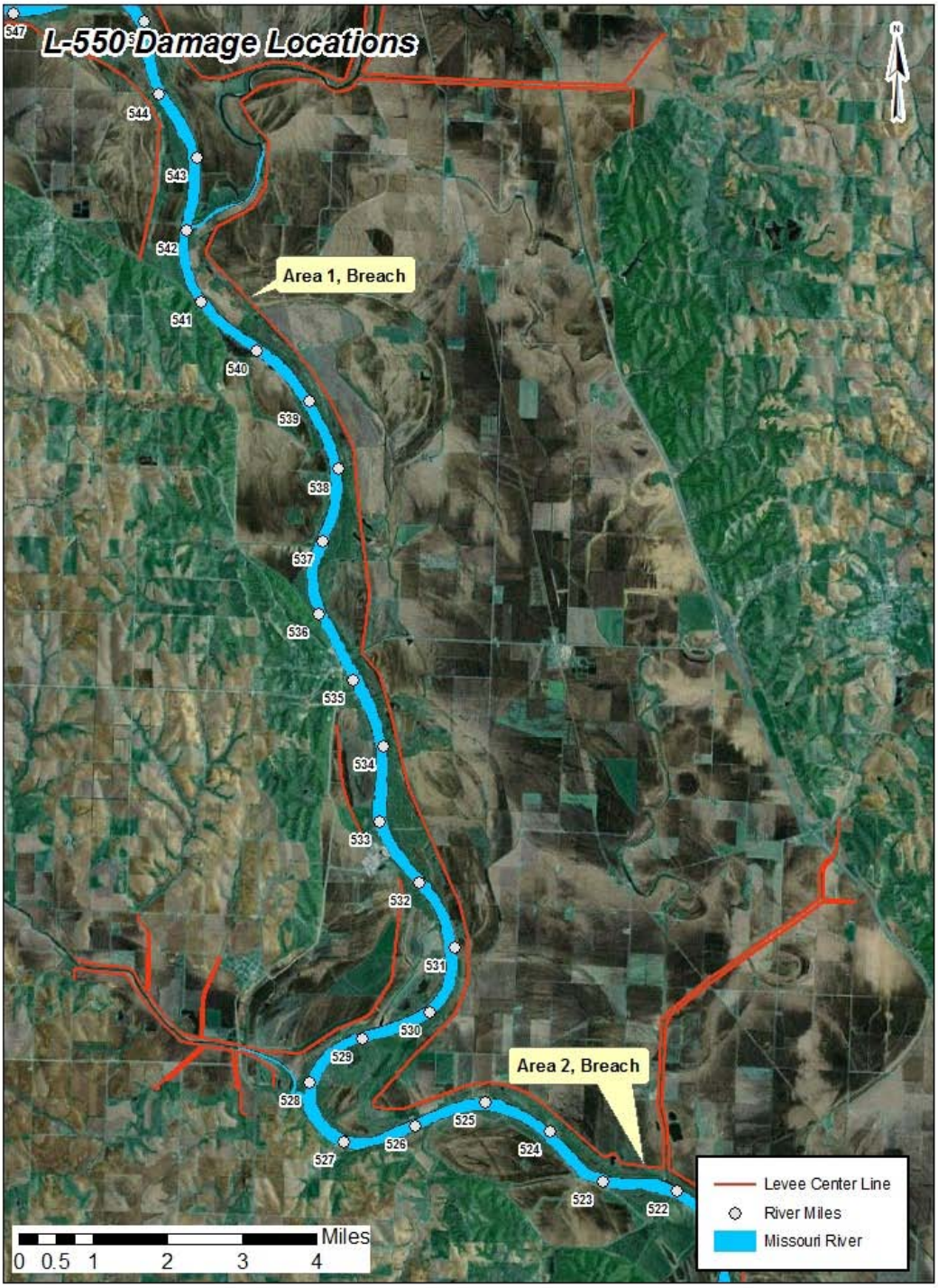

Figure 2a. Aerial Map of Missouri River Levee Unit L-550 showing breached locations (Note: Area 1 on this map refers to Area 3 on Figure 1; and Area 2 refers to Areas 14/15).

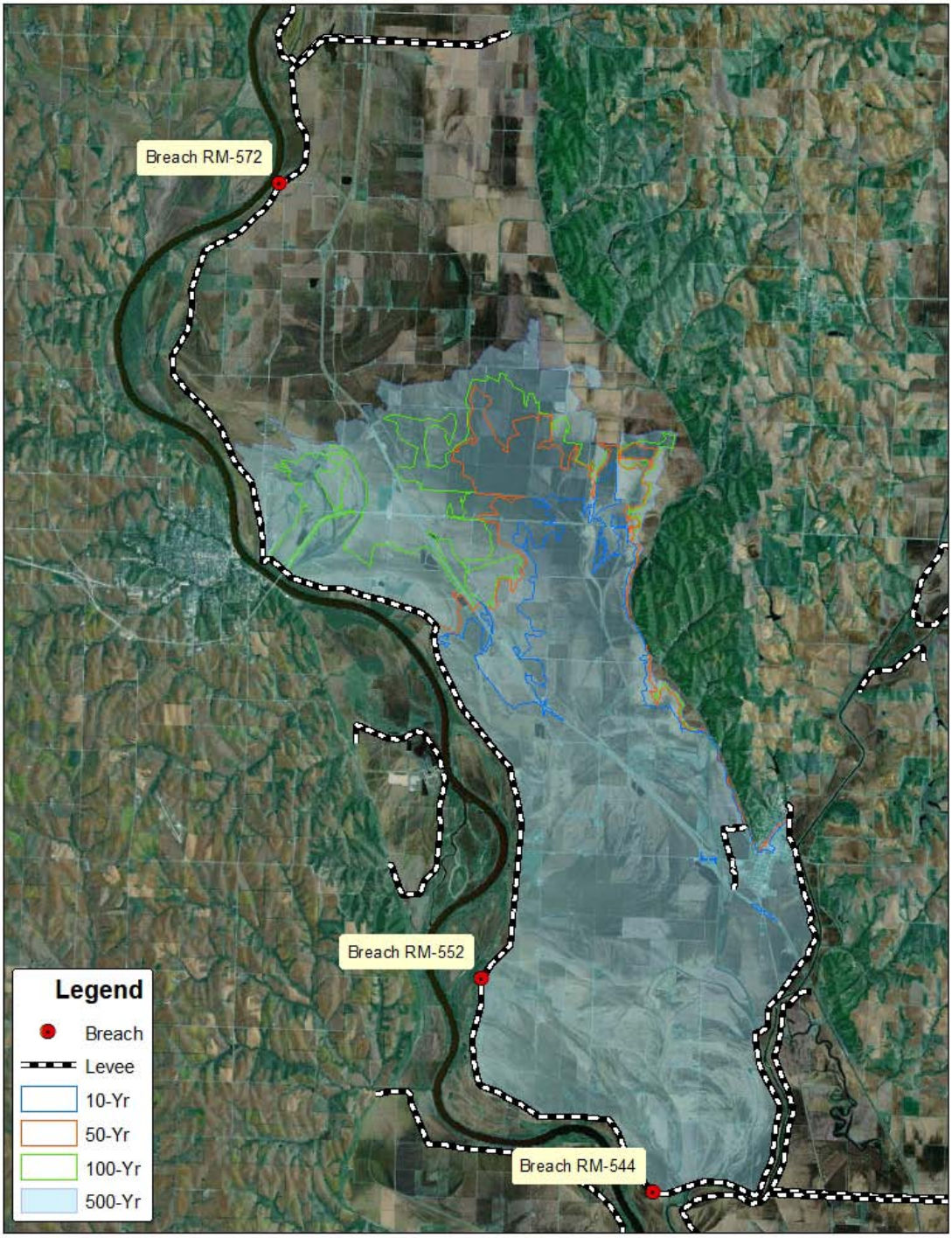

Figure 2b. Aerial Map of Missouri River Levee Unit L-575 showing breached locations.

Figure 3. Area 7 – Missouri River – L550 Stations 543+00 to ~560+80
Photo Date: 30 August 2011
Breach & Erosion/Scour

Figure 4. Area 14/15 – Missouri River – L550 Stations 1326+80 to ~1336+00
Photo Date: 30 August 2011
Levee Breach

Figure 5. Area 3 – Missouri River – L575 Stations 545+00 to ~569+00
Photo Date: 30 August 2011
Levee Breach

Figure 6. Area 16 – Missouri River – L575 Stations 1544+00 to ~1574+00
Photo Date: 24 June 2011
Riverside Erosion prior to Levee Breach

Figure 7. Area 18 – Missouri River – L575 Stations 1882+00 to ~1892+00
Photo Date: 30 August 2011
Levee Breach

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Personal Communication

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Dredging Operation Guidelines
For In-channel Dredging

1) Hydrographic Surveys. Perform pre-dredging and post-dredging surveys of the dredge zone and adjacent channel. The survey area includes the entire river channel (bank to bank) within the dredge operation zone plus the entire river channel a distance of 1 river mile upstream from the further upstream dredge operation point and 1 river mile downstream from the furthest downstream dredge operation point. Hydrographic surveys shall consist of cross sections conducted at a maximum spacing of 50 feet. An intermediate survey of the entire survey area is required whenever the dredge ceases operation for more than 15 consecutive days. Results will be used to ensure compliance with other dredging guidelines listed below.

2) Record Global Positioning System (GPS) coordinates, tons of material removed, and the presence of any hard substrates or unusual concentration of gravel, which may act as pallid sturgeon spawning areas, daily. Dredge operation records shall be submitted to the Contracting Officers Representative daily in an electronic spreadsheet. If the dredge moves more than 100 feet in any one day then the amount of material removed from each location must be recorded separately.

3) The Missouri River channel includes numerous constructed projects that are intended to create shallow water habitat in addition to naturally existing shallow water habitat areas. No dredge operation is permitted within the shallow water habitat zone which consists of all channel areas with depths between 0 and 5 feet at a flow level equal to the August 50% duration flow without the written permission of the Contracting Officer's Representative. The Contracting Officer's Representative shall supply the Contractor with the shallow water habitat elevation for all dredge zones. It is the Contractor's responsibility to exclude all shallow water habitat areas within the dredge zone from dredge operation.

4) Dredging must be confined to between the Rectified Channel Lines (RCL) with the following restrictions. Dredging must be conducted in such a manner to preserve the structural integrity of the landmass landward of the RCL. This must be accomplished by maintaining an adequate "no dredging or discharging" zone riverward of the RCL so that material will stabilize into the dredging area at its natural angle of repose with an adequate safety buffer. This slope will vary depending upon river location and the type of material being dredged, but the Contractor is responsible to ensure that this shallow water interface landward of the RCL be maintained.

5) Maximum dredge depth within the RCL zone shall not exceed the lesser of 20 feet below the construction reference plane (CRP) and 5 feet above the existing channel thalweg. The Contracting Officer's Representative shall supply the Contractor with the CRP elevation for all dredge zones. The existing channel thalweg elevation is defined by the most recent government survey that was conducted in 2008 and will also be furnished to the Contractor by the Contracting Officer's Representative. Maximum dredge depth in approved areas outside of the RCL will be furnished by the Contracting Officer's Representative.

6) No dredging is permitted within 500 feet of any levee centerline, pipeline, or submerged utility crossing, bridge pier or abutment; nor within 80 feet of any dike, revetment, or other structure built or authorized by the U.S. Government; nor within 80 feet of any normal bank line or island. This condition presents only the minimum distances away from structures and natural features that you can conduct dredging and does not relieve you from liability form

damage arising from dredging. The Contractor is responsible to ensure that dredging does not cause damage to public and private property.

7) Under no conditions will the Contractor dredge in such a manner as to direct channel flow currents toward an existing structure, bankline, or other feature. The Contracting Officer's Representative may require the Contractor to alter the dredge zone at any time based on observed flow conditions.

8) No dredging is permitted in a zone extending 5,000 feet upstream and 500 feet downstream from any municipal drinking water intake structure located along either bank of the river.

9) No dredging is permitted in a zone extending 1,000 feet upstream and 1,000 feet downstream from any municipal drinking water horizontal collector wells located along either bank of the river.

10) No dredging is permitted in a zone extending 500 feet upstream and 500 feet downstream from any other water intake structures.

11) Conditions that specify a linear distance exclusion zone for dredging operations refer to the operation of the cutter head location. All distances will be measured from the cutter head location.

12) During normal dredge operations, it is expected that the dredge action will dislodge more material than is collected. The Contractor shall include all prudent actions to limit this discharge of excess material into the Missouri River. The Contractor may discharge only materials that are free from toxic pollutants in other than trace quantities. The Contractor must investigate for water supply intakes or other activities which may be affected by suspended solids and turbidity increases caused by work in the watercourse. The Contracting Officers Representative, may, at any time, elect to require the Contractor to include turbidity monitoring to evaluate water quality impacts.

13) The Contractor must employ measures to prevent dredged materials stored or placed on shore in any designated areas from running off or eroding into wetlands or tributaries.

14) The Contractor must employ measures to prevent or control spilled fuels or lubricants from entering the waters of the United States.

15) The Contractor must store all construction materials, equipment, and/or petroleum products that are part of all operations, when not in use, above anticipated high water levels.

16) The Contractor must conduct operations in the Missouri River such that there will be no unreasonable interference with navigation or public recreation. Dredge operations and all associated lines shall not cross the navigation channel nor interfere with normal boat traffic. The Contractor shall comply with all U.S. Coast Guard, State of Missouri, State of Nebraska, and USACE regulations concerning the prevention of navigation obstructions in navigable waters of the United States.